COMPARATIVE EFFICACY OF HYSTEROSCOPIC RE-CANALIZATION & MICROSURGICAL CANALIZATION IN PROXIMAL TUBAL OBSTRUCTION

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CERTIFICATE

This is to Certify that this dissertation entitled "COMPARATIVE EFFICACY OF HYSTEROSCOPIC RE-CANALIZATION AND MICROSURGICAL CANALIZATION IN PROXIMAL TUBAL OBSTRUCTION" **is a bonafide work, done by Dr. P.K. KANCHANA at the Institute of Social Obstetrics,Kasturba Gandhi Hospital, Triplicane, attached to Madras Medical College, Chennai – 600 003, from 2006 - 2008 under our supervision and guidance in partial fulfillment of the regulations laid down by The Tamilnadu Dr.M.G.R. Medical University - Chennai, for the award of the degree of M.D. in Obstetrics and Gynecology.**

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Glossary

PTO	-	Proximal tubal obstruction
SIN	-	Salpingitis isthmica nodosa
HSG	-	Hysterosalpingography
UTJ	**-**	**Uterotubal Junction.**
IUD	-	Intra Uterine Death

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INTRODUCTION

Fallopian tubal disease is responsible for 20-30% of female infertility world wide [1] .Its importance as a major cause of infertility was recognized by ***Burns (1809)***[2]**.** Patent fallopian tubes are pre-requisite for normal human fertility. It has a crucial role in picking up eggs, also in sperm and ovum transport. It is the site of fertilization and important in nutrition of ovum. Such a highly specialized organ is vulnerable to infection and surgical damage that impair function by affecting the delicate fimbriae or the endosalpinx.

The causes of tubal obstruction are pelvic inflammatory disease, endometriosis or history of previous surgery. This study deals with proximal tubal obstruction.

Proximal tubal obstruction occurs in 12-33% of infertile couples ***(Decherney 1990)*** [1]. The conventional treatment for this condition was utero-tubal implantation. Earlier attempts on the surgical repair of the fallopian tube were met with very poor pregnancy outcome.

In 1980s, there was a transition from macro-surgical to microsurgical tubal anastomosis which was first described in 1977 by ***Gomel and Winston*** [3]. However this was technically difficult and there was increased incidence of ectopic pregnancy, surgical and anesthetic risks.

The development of minimally invasive techniques for correction of proximal tubal block began with tubal cannulation [4]. This procedure is popular with the recent development of tubal endoscopy techniques that have led to better assessment of tubal disease and successful patency.

The tubal cannulation can be done using hysteroscopy, fluoroscopy or sonar. Tubal cannulation by hysteroscopic control offers a number of advantages over the other techniques in that guidance of the tubal catheter into tubal ostia is simple , because it is done under direct vision. Secondly it is done along with laparoscopy, the presence of distal tubal disease or other factors can be diagnosed and treated simultaneously [4].

So it offers a one step evaluation and treatment in infertile patients with proximal tubal obstruction.

REVIEW OF LITERATURE

The fallopian tubes bear the name after ***Gabriele Falloppio*** an Italian surgeon (16^{th} Century). The fallopian tubes are paired, tubular seromuscular organs whose course runs medially from the cornua of the uterus toward the ovary laterally [(5)].

The tubes are situated in the upper margins of the broad ligaments between the round and utero-ovarian ligaments. Each tube is about 10 cms long with variations in 7-14 cms. The abdominal ostia is situated at the base of a funnel shaped expansion of the tube, the infundibulum, the circumference of which is enhanced by irregular process called fimbriae. The infundibulum opens into a thin walled ampulla forming more than half the length of the tube. It is succeeded by isthmus consisting medial one third of the tube, the interstitial or cornual portion of the tube continues from the isthmus to the uterine cavity.

The intramural portion of the tube is divided into 2 segments, proximal segment of 1 cm in length which follows a straight path, and 1.5 cms of distal segment which is sinuous. The thick muscular wall and convoluted intramural course makes the uterotubal junction a likely site for blockage by uterine debris.

The tube act as ducts for sperm, oocyte and fertilized ovum transport, in addition to being the normal site of fertilization which depends mainly on three factors, tubal motility, tubal cilia and tubal fluid.

The tubal peristaltic contractions are brought about by 3 intrinsic systems [6].

1) Estrogen-progesterone hormonal milieu
2) Adrenergic and Nor-adrenergic system
3) Prostaglandins

Tubal cilia are most prominent in fimbrial end and process of ciliation is enhanced by the hormone estrogen. Ciliary activity is responsible for pick up of ova and also distribution of tubal fluid which facilitates embryo transport.

In the literature, there have been many techniques in the treatment of tubal disease that range from old laparotomy , gaseous insufflation, hydrotubation, microsurgery , laparoscopic surgery and more recent endoscope procedures.

The advent of diagnostic and operative endoscope has dramatically changed the field of gynecology surgery over the last several decades in the treatment of tubal disease**.(*Kerin J 1990*)** [7].

Selective fallopian tube catheterization under hysteroscopic guidance has been shown to be useful in both diagnostic evaluation and treatment of proximal tubal obstruction. The first description of selective tubal catheterization appeared in the ***Lancet*** in 1849, decades before the first X-ray image [(8)].

William Tyle smith[(8)] Lecturer in the Hunterian school in London in the year 1894, proposed a new method of treating sterility by removal of obstruction of fallopian tube. He used a transvaginal route to pass a whale bone bougie through a J shaped silver cannula positioned in the uterine cornua, there by clearing proximal occlusion.

In 1963, ***Sweeney*** [(9)] et al, tried placing a catheter with smaller size 7 F (French) catheter used for bronchial artery catheterization, into the fallopian tube.

In 1985***, Platra and Krudy*** [(10)] used 3 F catheter to clear proximal obstruction. This technique has been favored by technological improvements in catheters and guide wires and by its low cost and simplicity.

In 1988, ***Confino*** [(11)] described transcervical ballon tuboplasty in the treatment of PTO. The more expensive balloon catheter did not appear to offer any advantage.

In 1991, ***Thurmond*** [(4)] described the technique of selective salpingography and tubal re-canalisation and this has been widely used to improve diagnosis and treatment of PTO.

Fallopian tube canalization is performed in a large number of patients and results in 1466 patients have been published (***Lang EK, Dunaway HE*** 1990) [12]. On the meta-analysis of 1466 patients successful recanalization was achieved in 71-92 %.

Su-chong et al **[13]**, performed hysteroscopic catheterization in 54 infertile women with previously diagnosed tubal disease. Patency was achieved in 62.5% of cases of intramural block and 38.8 % of isthmic stenosis.

Paul et al [14] performed hysteroscopic cannulation in 31 cases (58 tubes) of proximal tubal obstruction. At least one tube could be cannulated in 26 cases (84%). 9 patients conceived after hysteroscopic cannulation.

Other option of management of proximal tubal obstruction is microsurgical uterotubal anastomosis. Tubal surgery under magnification was introduced by ***Swolin*** in 1967. The use of microsurgical technique in tubal reconstructive procedures has been shown to dramatically improve clinical results.

The term pregnancy rates of conventional surgery ranged from 5.6-41% while those of traditional microsurgery range from 21-37% (***Verhoeven HC***-1983) [15]. The pregnancy rate after microsurgical repair of proximal tubal obstruction is 30-50% (***Zagoria RJ*** -1995) [16]

PATHOLOGY OF PROXIMAL TUBAL OBSTRUCTION

Proximal tubal obstruction is defined as blockage of the intramural part of proximal portion of the fallopian tube, which is potentially a reversible process.

Several pathological processes are implicated in PTO.

1) Amorphous material casts
2) Pelvic inflammatory disease
3) Endometriosis
4) Polypoid lesions
5) SIN
6) Tubal spasm

Amorphous material casts :

Presence of amorphous material forming a cast in the tubal lumen is presumed to be organized inflammatory exudates **(*Sulek 1987*)** [17]

Pelvic inflammatory disease:

Pelvic infection is a major cause of tubal subfertility. Pelvic inflammatory disease, including salpingitis is mostly caused by ascending gonorrheal, chlamydial and non specific infections [18]. The acute phase of salpingitis is characterized by edema of the plicae. With recurrent infection, the tubal plicae adhere and form typical adenomatous spaces. Eventually the entire tubal wall becomes involved, with subsequent occlusion of the fimbriated end.

Endometriosis:

It may affect the fallopian tube in severe cases and lead to tubal obstruction with hydrosalpinx formation. Tubal obstruction is more often caused by compression or stricture than by mucosal adhesions.

Salpingitis isthmica nodosa :

SIN is also a major cause of tubal obstruction. ***Wang 1989*** observed that Salpingitis isthmica nodosa was the cause in 33% of tubal obstruction. It is due to sequelae of inflammation either of gonorrheal or tuberculosis origin [(19)] .

Polypoidal lesion:

Osteal polyps block the opening of the proximal tube thereby causing obstruction.

Tubal spasm:

Normal rhythmic peristalsis of the ostia could be interrupted by prolonged periods of spasm.[(20)] Tubal perfusion pressure measured during selective salpingography is found to be high. Therefore transcervical tubal catheterization procedures which can reduce the perfusion pressure are useful.

Proximal tubal obstruction is classified into 3 categories (7). according to which patients can be decided upon the appropriate therapy.

Category1:

Non-nodular or complete fibrotic occlusion resulting from inflammatory process.

Category 2:

Nodular obstruction which results from SIN (Hall mark of SIN-presence of diverticula or out-pouchings of tubal epithelium which are surrounded by hypertrophied smooth muscle and is usually bilateral.)

Category 3:

Tubal obstruction resulting from polyps or amorphous debris within the lumen.

Patients in category 1 and 3 can be managed with Cannulation.

In most of the cases the histology of the resected segment of the occluded tube appeared normal. Data on the histology of proximal tubal segment described inflammation in 25%, SIN 25-30% and endometriosis in 10-15%.(17)

So proximal tubal obstruction is usually the result of thin mucus plug or debris that plugs the tubal lining at the uterotubal junction. Surgical correction is not warranted in majority of cases since there is no true block. So the ideal treatment of proximal tubal obstruction is Tubal Cannulation.

Falloscopic classification and treatment of fallopian tubal disease by **Kerin et al -1992** [21] developed a scoring system for tubal disease.

Site of the disease	**Right / Left tube**
Patency	
Normal	1
Stenosis	2
Obstruction	3
Epithelium	
Normal	1
Pale, atrophic	2
Flat, Featureless	3
Vascularity	
Normal	1
Intermediate	2
Poor Pallor	3

Site of the disease	Right / Left tube
Adhesions	
None	1
Thin Web like	2
Thick	3
Dilatation	
None	1
Moderate	2
Hydrosalpinx	3

Cumulative score:

Normal tubal lumen - 20

Moderate Endotubal disease - >20 and <30

Severe Endotubal disease - >30

Mucus plugs or tubal debris, endotubal polyps, SIN, inflammatory and neoplastic conditions and absent tubal segments are each assigned a score of 2-3 depending on the significance of lesion.

Boer-Meisel et al [22] graded tubal damage according to the following criteria:

1. The extent of the adhesions
2. Nature of the adhesions

3. Diameter of the hydrosalpinx

4. Macroscopic condition of the endosalpinx

5. Thickness of the tubal wall.

Using these criteria, patients are classified into three prognostic groups: Good, Intermediate, and Poor. For the Good prognostic group, the chances of term pregnancy after tubal surgery have been reported to be 77%, the pregnancy rates for the Intermediate and Poor prognostic groups have been reported to be 16% and 3% respectively.

According to **Putteman**'s [23] classification, Fallopian tubes are classified into 5 groups based on the salpingosopy.

Grade I	-	Normal mucosal folds
Grade-II	-	Major folds are separated, flattened but otherwise normal
Grade-III	-	Focal adhesions between the mucosal folds are seen
Grade IV	-	Extensive adhesions between the mucosal folds
Grade V	-	There is complete loss of mucosal fold pattern

Diagnostic approaches to check tubal patency

Hysterosalpingography:

It is the gold standard test to assess the tubal pathology. It is performed easily, less invasive and provides reliable information about the tubal function at lesser costs than other methods. ***Swart et al*** [24] 1995 showed sensitivity of HSG in diagnosing tubal patency 0.65(95% C.I) and specificity of 0.83 (95% C.I) .

Hysterosalpingo-contrast salpingography:

It is a simple Out-patient procedure using ultra sonogram. An echo contrast fluid is introduced into the uterine cavity via cervical balloon catheter so that the uterine cavity, ovaries and the fallopian tube patency can be assessed accurately.

Laparoscopy and dye hydrotubation test:

It is a day care surgical procedure done under General anesthesia. Morphologic abnormalities of the fallopian tubes can be seen directly and also general pelvic appearance. If HSG shows tubal block of suspicion it can be confirmed with laparoscopy. Tubal patency can be checked out after any surgical correction of tubal occlusion.

Transvaginal hydrolaparoscopy:

Hydrolaparoscopy expands on the old technique of culdoscopy and involves an infusion of saline into the pelvis via a verres needle inserted into the posterior vaginal fornix, followed by introduction of a specially designed small caliber endoscopic instrument into the cul-de-sac.

MANAGEMENT OPTIONS OF PROXIMAL TUBAL OBSTRUCTION

There have been many techniques in the treatment of tubal disease that range from microsurgery to more recent laparoscopic surgery and the endoscopic procedures.

1) Fluoroscopy guided cannulation [25]

2) Hysteroscopy guided cannulation [14]

3) Ultrasound guided cannulation [26]

4) Blind or tactile stimulation

5) Falloposcopy techniques [27]

In this study cannulation was done using the 'Versa point' (Micro- hysteroscope)

Hysteroscopic cannulation can be done by various techniques:

1. Flexible guide wire through the catheter
2. Falloscopy guided cannulation
3. Transcervical balloon cannulation and linear eversion catheters

We used flexibe guide wire for cannulation. (3 F guiding with an outer tube of 5F)

The intent of any surgical approach to proximal tubal obstruction should be to maximize tubal length and preserve as much of the intramural segment.

The merits and demerits of various techniques and its outcomes

Flouroscopy guided transcervical catheterization :

Flouroscopic techniques are less invasive, allows concurrent selective salpingograph, but there is risk of exposure to radiation, expensive and not readily available.

Martesson et al [28] 1993 showed patency in 61.5% using this technique. Out of 10 patients, 50% had intrauterine pregnancy and 10% patients with extra uterine pregnancy.

Laparoscopic guided transvaginal catheterization:

Laparoscopic surgery offers greater comfort to the patients and is more economical with shorter operative and postoperative hospitalization. It requires a skilled person and it plays a major role in the management of distal tubal lesion. ***Lissie and Sydow*** [29] (1998) in 19 patients showed patency in 84.2%, with intrauterine pregnancy reported to be 26.3%.

Non hysteroscopic falloscopy:

Falloscopic techniques are less invasive, have high patency rates, requires minimal anesthesia but appears to be limited to non-fibrotic tubal obstruction, with higher incidence of re-occlusion in 19.6% of

cases within 3 months. ***Sueoka et al*** 1998 [30] in 50 patients showed patency in 85.3%, with intrauterine pregnancy in 22 cases.

Ultrasound guided cannulation:

Ultrasound guided cannulation is inexpensive, readily available, can be used on an outpatient basis. The fallopian tube is a tortuous organ which renders ultrasonographic imaging difficult. Frequent movements of the catheter tip calls for continuous movement of the transducer. Visualisation of micro bubbles through the fallopian tube "lighting up" is a less equivocal sign of tubal patency. Out of 30 patients, tubal patency was achieved in 96% of cases, with intrauterine pregnancy in 38% of cases. [31]

Hysteroscopic tubal catheterization and hydrotubation:

It is relatively inexpensive, requires minimal anesthesia. It offers multiple monthly attempts. Chances of subsequent pregnancies are more when the tube continues to be patent. It allows direct visualisation of ostia. As it is done in conjunction with laparoscopy, it allows assessment of distal end of tubes and ovaries.

Suchong et al (1994) [13] studied hysteroscopic cannulation in 54 patients with patency proved in 50%, intrauterine pregnancy in 24% of cases but no ectopic pregnancy was observed in his study.

Microsurgical anastomosis:

It is indicated in cases where tubal cannulation cannot be performed, when there is extensive tubocornual disease or re-anastomosis in patients who are already sterilized.

Principles of Microsurgery:

1) Atraumatic technique
2) Meticulous hemostasis
3) Magnification
4) Irrigation
5) Complete excision of the pathological tissue
6) Continuous Peritoneal lavage

De-Merits of Micro Surgery :

1. Hospitalization and operative costs are expensive
2. Requires general anesthesia
3. Possible prolonged recovery time
4. Relatively higher risk for ectopic pregnancy
5. Relatively prolonged time for conception
6. If tubal occlusion is due to mucus plug, microsurgical anastomosis would convert an apparently normal tube into a scarred one.

SELECTION OF CASES

Inclusion criteria

Infertility of at least one year of unprotected intercourse.

Secondary infertility after 3 years of child birth or 1 year of previous pregnancy loss.

Prior gynecological evaluation of infertility.

Prior evaluation of male factor.

Exclusion criteria

One tube patent.

Distal tubal block or bipolar block.

Any evidence of acute pelvic infection.

Present and past history of Tuberculosis.

Any medical illness contraindicated in Hystero-laparoscopy.

Any organic lesion of the uterus.

Other causes of infertility.

Previous history of ectopic pregnancy.

AIM OF THE STUDY

- Comparing the efficacy of Hysteroscopic cannulation and Microsurgical tubal anastomosis as a method of tubal re-canalization in proximal tubal obstruction.

- To assess the safety and relative complications between these two methods.

MATERIALS AND METHODS

This study was conducted in the Institute of Social Obstetrics Government Kasturba Gandhi hospital from August 2006 to July 2007. The study was approved by the hospital ethical committee.

Study Design : Prospective analytical study.

Study place : Institute of Social Obstetrics, Kasturba Gandhi hospital.

Study sample : 50 infertile women with bilateral tubal occlusion.

Study period : August 2006-July 2007

From women attending the Infertility clinic, based on the inclusion and exclusion criteria, HSG was performed in 186 women with infertility.

Of the 186 women in whom HSG was performed, 99 patients had normal tubal spill , 13 cases had unilateral tubal block and 74 cases had bilateral tubal block. Of these, 38 patients had cornual block and 20 patients had suspicious finding of either tubal block or spill and they were subjected to laparoscopy for confirmation of tubal pathology. 16 patients had block in various parts of the tube other than cornua and hence were excluded from the study.

Procedure of Hysteroscopic cannulation:

All the patients were explained about their tubal pathology and the available procedures for correcting them. Hysteroscopic canalization was also explained to them and 50 patients were willing to undergo the procedure. These patients were further explained about the procedure, complications involved, and the success and failure rate of the procedure. After getting informed consent from them, they were prepared for the surgery.

Instruments:

"Versa scope" was used in this study. The telescope is 1.8mm in diameter with an outer sheath of 3.5mm which has 3 channels, inflow and outflow channels and one for instrumentation.

Distending medium used was normal saline with inflow rate of 100 ml/ minute.

Timing of the procedure:

Sixth or seventh day of the menstrual cycle (after the period completely ceases).

Anesthesia:

General anesthesia

Position – Lithotomy position

Procedure:

After anesthesia and placing the patient in the lithotomy position, the external genitalia and the area around is cleaned and draped. Bladder is catheterized. Bimanual pelvic examination is done. The anterior lip of the cervix is caught with a volsellum and then the hysteroscope is introduced into the uterine cavity under vision and with the saline running all the time at a rate of 75mm pressure or 100 ml per minute. Using gentle manipulation, hysteroscope is advanced slowly, following the contour of endocervical canal. Once the internal os is passed, the uterine cavity is visualized thoroughly and through the distal tip both the ostia were visualized. The two way angulations of the distal tip allows for close observation of the uterine cavity in particular UTJ.

Cook's novis tubal cannulation set is used, and the guide wire is pushed into the ostia for 2-3 cms beyond the obstruction and the procedure is repeated on the other side. The hysteroscope is then withdrawn and chromopertubation by laparoscopy is done to confirm the result of cannulation by looking at the tubal spill on both the sides.

Complications of hysteroscopy include perforation of the tube, fluid overload due to the distending media used and hemorrhage.

Postoperative care:

Patients were treated with antibiotics and antispasmodics.

MICROSURGICAL TUBAL ANASTOMOSIS:

Routine fish mouth technique of tubocornual anastomosis is done in our institution.

Instruments:

1) Zeiss operating microscope
2) Microsurgical instruments
3) Bipolar diathermy and forceps
4) Irrigation set

Procedure:

1) Site of blockage is confirmed by injecting methylene blue dye through the cervix.
2) Preparing the fallopian tube: Using magnification, fine slices of tissues are carefully removed from the cornua from the point where the tube joins the uterine muscle.
3) The anastomosis: Broad ligament stay sutures are then placed to approximate the two prepared areas, tube and the uterine cornua. This avoids tension on the anastomotic suture and also easier to perform. A fine splint with 1-0 Prolene is used to assist the correct alignment of the tubal lumen. Anastomosis is carried out in 2 layers with 6-0 Ethilon suture.

4) Railroading of the tube: Four cardinal sutures are placed through the muscle of both prepared ends and then the distal portion of the tube is railroaded down the cornua over the intra-operative splint. At the end of anastomosis, splint is removed via the fimbrial end. The first layer is then tied. The Serosal layer is closed using 6-0 Ethilon suture.

5) Hemostasis is achieved by continuous irrigation with Heparinated saline.

6) Tubal patency is checked at the end of surgery. Methylene blue dye is injected into the uterus to check tubal spill.

Complications:

Early complications: Wound infection, Fever.

Late complications: Re-occlusion, Ectopic pregnancy 14% (***AORN J*** 1997)

RESULTS AND ANALYSIS

Table 1: HSG RESULTS

No of Infertile Women subjected to HSG	No. of cases with Normal findings	No of Cases with Bilateral Block	No Of cases with unilateral block
186	99	74	13

- Total number of women subjected to HSG- 186 cases;
- 99 women had normal tubal spill in both the tubes.
- Patients with bilateral tubal block were 74 cases
- 13 cases of unilateral tubal block.

Table 2: HSG RESULTS

No of Cases with Tubal Block	With Cornual Block	Suspicious Lesion	Tubal Block other than Cornua
74	38	20	16

- 38 patients had bilateral cornual block and 20 patients had suspicious lesions.
- 20 of them underwent preliminary laparoscopy in view of suspicion.
- 8 were excluded from the study since the laparoscopy failed to reveal cornual block.

Table 3: CONFIRMATION OF PROXIMAL TUBAL BLOCK

No of cases with tubal block confirmed by HSG	No of cases confirmed by preliminary laparoscope
38	**12**

- Out of 20 patients, 12 patients with suspicious diagnosis by HSG were confirmed to have cornual block by laparoscopy.
- After all the required procedures, 50 women were found to have cornual block.
- The rest of them with blocks had it at various parts of the tubes. Hence they were excluded from this study.

Table 4: AGE DISTRIBUTION

n = 50

Sl. No	Age Group (yrs)	Number of Patients	% of Patients
1.	25 and less	6	12
2.	26-30	34	68
3.	31-35	10	20
Total		50	100

- In this study number of patients under age group 26-30 was more compared to other age group patients.

Distribution of cases according to the age:

N	Mean	SD	SE	LCL %	UCL %
50	27.4	2.75	0.3898	26.65	28.23

Table 5 : DISTRIBUTION OF CASES ACCORDING TO MARITAL AGE

Sl No	Duration of Marriage (Yrs)	No of cases	Percentage %
1.	1 - 3	6	12
2.	4 - 7	29	58
3.	8 - 11	11	22
4.	> 11	4	8
	Total	50	100

Result:

- In this study number of cases in the marital age between 4-7 years was more.
- These are the patients who consulted many gynecologists and tried many number of treatment protocol.
- Patients more than 30 years were subjected to this treatment methodology even after one year of marriage.

Distribution of cases according to the marital age:

N	Mean	SD	SE	LCL%	UCL%
50	6.66	2.7598	0.39030	5.875661	7.444339

Table 6: DISTRIBUTION OF CASES ACCORDING TO INFERTILITY

Infertility	No of cases	% of Cases
Primary	24	48
Secondary	26	52
Total	50	100

- In this study there were 24 cases of primary infertility (48%) and 26 cases of secondary infertility (52%).
- Cases of secondary infertility include those with last child birth of more than three years and previous history of pregnancy loss of one year duration.
- In this study there were 4 cases of IUD, 12 cases of spontaneous abortions and 10 cases of previous full term normal deliveries.

Table 6 A: DISTRIBUTION OF INFERTILITY ACCORDING TO AGE

Sl No	Age (Yrs)	Primary Infertility	Secondary Infertility
1.	25 & Less	4	2
2.	26 – 30	19	15
3.	31 – 35	1	9

Distribution of infertility according to age:

Infertility	N	Mean	S.D	S.E	L.C.L	U.C.L
Primary	24	26.375	2.0602	0.4205	24.3825	27.244
Secondary	26	28.4230	2.9822	0.5848	27.218	29.627

P value = 0.007296 (Significant)

This suggests that a significant number of women in the primary and secondary infertility belonged to the age group of 26 and 28 years respectively, as women in this age group are sexually active.

Table 6 B: DISTRIBUTION OF INFERTILITY ACCORDING TO MARITAL AGE

SL No	Duration of Marriage (Yrs)	Primary Infertility	Secondary Infertility
1.	1 – 3	4	2
2.	4 – 7	17	12
3.	8 – 11	2	9
4.	> 11	1	3

Distribution of Infertility according to marital age:

Infertility	N	Mean	S.D	S.E	L.C.L	U.C.L
Primary	24	5.6666	2.1400	0.4368	4.7630	6.5703
Secondary	26	7.5769	2.9822	0.5848	6.3723	8.781

P value= 0.012903(significant)

Similarly longer the duration of marriage, more is the chance of infertility as the incidence of tubal occlusion increases with number of exposure to sexually transmitted disease.

Table 6 C : DISTRIBUTION OF CANNULATION ACCORDING TO INFERTILITY

INFERTILITY	PATENT TUBE	NOT PATENT
Primary	18	2
Secondary	19	0

P=1.000 (Not significant)

There was no statistical significance in the success of cannulation to the type of infertility.

Table 7: NO OF CASES WITH SUCCESSFUL CANNULATION

Cases subjected to cannulation	Successful	Unsuccessful
50	37	13

- In 37 out of 50 patients there was no difficulty in performing hysteroscopic cannulation.
- In 11 patients the procedure could not be performed due to technical difficulties and were taken up for microsurgical tubal anastomosis.
- In the remaining 2 patients post operative spill could not be demonstrated and hence they were considered as failure and thus included.

Table 8: RESULT OF CANNULATION

No of cases under went Cannulation	Tubal Patency		Blocked Tubes
	Bilateral	Unilateral	
39	13	24	2

Result:

- Of the patients who underwent hysteroscopic Cannulation, 37 patients had tubal patency with bilateral tubal patency of 13 cases and unilateral tubal patency in 24 cases and with no spill in 2 cases.

- These two patients were offered microsurgical intervention but are still undecided.

Table 9: RESULTS OF MICROSURGICAL TUBAL ANASTOMOSIS

No of cases	Success	Percentage	Failure	Percentage
11	7	64%	4	36%

Result:

- Number of cases posted for microsurgical tubal anastomosis was 11 cases, of whom successful outcome were among 7 cases.
- It was unsuccessful in 4 cases probably reflecting the severity of the tubal disease.

Table 10: COMPARATIVE DATA OF PATENCY BETWEEN TUBAL CANNULATION & MICROSURGERY

n = 44

No of cases with tubal patency	Hysteroscopic cannulation		Microsurgical Anastomosis	
	Success	Failure	Success	Failure
44	37	2	7	4
% of Achievement	94%		64%	

Table 10 A : TUBAL PATENCY WITH BOTH TECHNIQUES

n=44

Technique	Spill	No Spill
Cannulation	37	2
Micro Surgical Anastomosis	7	4
Total	44	6

Fisher exact- 0.0331 (P value is significant)

Result:

- The tubal patency rate following hysteroscopic cannulation was 94% and that following microsurgical intervention was 64%.
- The outcome in both the techniques is significant.

Table – 11A : TUBAL PATENCY ACCORDING TO AGE GROUP

n = 44

Age group (Yrs)	Cannulation	Percentage	Microsurgical Anastomosis	Percentage
25& less	5	13%	0	0%
26 - 30	24	65%	6	86%
31 - 35	8	22%	1	14%

Result:

- Majority of cases with tubal patency achieved by either techniques were in age group between 26 – 30 Years.

Table 11 B : DISTRIBUTION OF TUBAL PATENCY

ACCORDING TO MARITAL AGE

n = 44

Marital age (Yrs)	Cannulation	Percentage	Microsurgical Anastomosis	Percentage
1 – 3	5	13%	0	0%
4 – 7	23	63%	2	28%
8 – 11	6	16%	4	58%
> 11	3	8%	1	14%

Result :

- Tubal patency by Cannulation achieved in patients with period of infertility between 4-7 years (63%) was more.
- Tubal patency by Microsurgical anastomosis was achieved in 58% of patients with duration of marriage between 8-11 years.

Table 12: DURATION OF THE PROCEDURE

Technique	Duration
Hysteroscopic Cannulation	20 – 30 minutes
Microsurgical Anastomosis	65 – 90 minutes

- Duration of the procedure 20 - 30 minutes.

- Duration of Surgery (Micro Surgical Anastomosis) :

  65-90 minutes.

Table 13: DURATION OF HOSPITAL STAY

Technique	**No of Days**
Hysteroscopic Cannulation	3
Microsurgical Anastomosis	7

Hospital stay including the preoperative and postoperative period

Hysteroscopic cannulation - 3 days

Microsurgical anastomosis - 7 days

Table 14: COMPLICATIONS IN EACH TECHNIQUE

Complications	Micro surgical Anastomosis	Cannulation
Wound sepsis	1	0
UTI	1	1
Vaginal bleeding	0	5

Result :

- One patient following microsurgical anastomosis developed wound infection.
- 5 patients who underwent cannulation had moderate vaginal bleeding with uterine cramps.

DISCUSSION

Table 1, 2, 3:

In a study by ***Siegler A*** – 1988 [24, 33] showed proximal tubal obstruction by HSG in 10-25% of cases.

In this study the confirmed cases of tubal block by HSG in total infertile women was 20.45%. And remaining cases with suspicious lesions, laparoscopy confirmed proximal tubal obstruction.

Table 4:

Distribution of cases according to the age:

In the study by ***Rosch J*** [34], 1988 patients who were included in the study ranged from 26-40 years with mean age of 32.8 years.

Incidence of tubal occlusion increases with number of exposures to sexually transmitted disease [35].

One single exposure	-	10-12% of cases with tubal occlusion
2 Episodes	-	25-35%
3 Episodes	-	54-75%.

In this study mean age was 28.5 years, ranging from 23 years to 35 years

Table 5:

Distribution of cases according to the marital age:

Mean duration of infertility was 3.3 years (range from 1-7 years) in a study by ***Rosch J.Thurmond*** – 1988 [34]

In this study duration of marriage was 6.66 years ranging from 1-12 years.

Table 6, 6A, 6B,11B :

Distribution of cases according to type of infertility:

In the study conducted by ***Segars JH Herbert CM, Moore DE*** – 1990[36], 5 patients with primary infertility and 17 patients with secondary infertility were included in the study and these patients underwent hysteroscopic cannulation. 5 patients with secondary infertility had a single previous pregnancy, while 12 other patients had a total of 34 previous pregnancies. Mean gravida – 2.3% Mean parity-0.88%

In this study out of 50 cases, 24 cases of primary infertility and 26 cases of secondary infertility were selected. Of 26 cases, ten patients had previous full term normal deliveries and 12 patients had previous miscarriages; 4 patients had IUD.

In this study significant number of cases with primary and secondary infertility was in the age group between 26 to 28 Years. Longer the duration, chances of infertility are more.

Table 7 :

Cases of successful cannulation

In 80 to 90% of the cases, tubal cannulation is successful in restoring patency of at least one fallopian tube. About 30% of patients got pregnant in the first 3 to 6 months after the procedure. This is the study performed by ***Woolcot R 1995*** [37].

Gomel et al in the year 2002, advocated that in all cases of proximal tubal obstruction, selective tubal cannulation should be attempted first with microsurgical tubocornual anastomosis reserved for failures.

Letterie and Sakar [17] evaluated Histologic findings in 15 Patients at laparotomy after failed tubal cannulation. They found that 93% of the patient had severe disease suggesting that tubal cannulation might distinguish functional obstruction from occlusion.

In this study all 50 cases were posted for cannulation, 37 patients had easy cannulation. In the remaining 11 cases cannulation was technically difficult and 2 cases of cannulation failure were planned for microsurgical anastomosis.

Table 8,10:

Result of Cannulation:

In a study of hysteroscopic cannulation by ***Rosch J.Thurmond*** – 1988 [34] of the 22 patients who underwent the procedure, bilateral tubal spill was obtained in 8 cases, 7 cases had unilateral tubal spill. Radiologically abnormal but patent tubal spill were 2 cases, and 5 cases showed abnormal tubes with no tubal spill. In this series at least 1 patent tube existed after catheterization in 17 of 22 patients.

61% of bilateral tubal spill and 77% of unilateral tubal spill were found in the study by ***Sulak P*** [17]

Hysteroscopic tubal cannulation to repair intramural or interstitial obstruction can result in a patency rate of up to 90% in at least 1 tube and a pregnancy rate in the range of 50-60%. **(Fayez.JA 1983)** [38]

In this study out of 37 cases, tubal patency in both the tubes were achieved in 13 cases and one side spill in 24 cases, confirmed by laparoscopic chromopertubation. (35.5% of bilateral tubal spill and 64% of unilateral tubal spill). Thus in this study, tubal patency by hysteroscopic cannulation was achieved in 94% of operated women.

Table 9,10:

Results of microsurgical anastomosis

Marge G,et al [39] 1990 in his study

Tubal Score	**Lap Micro Surgery**		**Open Micro Surgery**	
	No Of Cases	**Percentage**	**No Of Cases**	**Percentage**
I	37	50.%	12	66.6%
II	32	32.4 %	30	36.6 %
III	12	8.3%	21	14.3%
IV	6	0.0%	76	7.7%

Microsurgical techniques and its outcome:

Various Techniques	**Pregnancy**
Tubocornual Anastomosis	50 %
Reversal of Tubal sterilization	70 %
Salpingostomy	30 %

Haspel-Siegel AS [40]

Overall pregnancy outcome in microsurgical anastomosis [40]

	No Of Cases	Pregnancy	Ectopic
Mild	10	6	1
Moderate	29	9 (31)	4 (14/44)
Severe	56	9 (16)	2 (4/22)

Winston and Gomel [41] in their study in patients who underwent microsurgical anastomosis showed success rate of 70%.

This study shows tubal patency with microsurgical tubal anastomosis is 64%.

Table 12 :

Mean duration of the procedure (Hysteroscopic cannulation) ; 25 minutes. Mean duration of microsurgical tubal anastomosis. 90 minutes

Table 13:

Duration of the hospital stay following hysteroscopic Cannulation.

In this study the mean duration of hospital stay-3 days .

Duration of the hospital stay following microsurgical anastomosis is 7 days.

Table 14:

Complications of hysteroscopy cannulation/ microsurgical anastomosis:

Incidence of postoperative complications following microsurgical anastomosis in a study by ***Shakted E J*** [42]

Complications	**Percentage**
Fever	13 %
Paralytic	3 %
Urinary Tract Infection	6 %

In a study by ***Thurmond et al*** [34] perforation occurred in 5% of cases. No treatment was required in these cases. 2 patients developed vaso-vagal reaction, which was treated with IV fluids. Extravasation of the contrast agent was noted in nine cases.

In this study two patients had extended convalescent period as one developed wound sepsis and the other suffered from urinary tract infection following micro surgical anastomosis. One patient who underwent hysteroscopic cannulation suffered from urinary tract infection and 5 patients with moderate vaginal bleeding were treated with anti inflammatory drugs and hemostatic drugs.

SUMMARY

This prospective analytical study was undertaken in Government Kasturba Gandhi hospital, Chennai during the period of 2006-2007 among the 50 infertile women after confirming proximal tubal obstruction.

The various observations are:

1. In this study, the significant number of women with primary and secondary infertility, belonged to the age group 26 to 28 years.
2. In this study longer the duration of marriage, more severe is the tubal disease, as there is increase number of sexual exposures. This showed statistical significance.
3. Type of infertility did not significantly alter the result of cannulation.
4. The tubal patency achieved by cannulation is 94% and the tubal patency achieved by microsurgical anastomosis was only 64%.
5. Tubal patency with both techniques achieved shows significant P value of 0.0331 by Fisher exact test.
6. Proximal tubal cannulation is the better option as mostly the obstruction is due to mucus plug or amorphous debris and is not due to true oclusion.

CONCLUSION

This study is on the comparative efficacy of Hysteroscopic re-canalization and Microsurgical tubal canalization in the management of proximal tubal obstruction.

This study reveals proximal tubal obstruction, as a frequent cause for infertility.

The incidence is higher with increasing age and also the duration of marriage.

Hysteroscopic recanalization appears to be a better option for a successful outcome.

The main drawback with this technique is that it can be performed only when the obstruction is without fibrosis or other associated complications.

Microsurgical canalization, on the other hand, can be performed even in those severely affected cases.

But the success rate is comparatively low and the procedure has a higher incidence of ectopic pregnancy.

Hence both the methods can be used for a successful outcome if they are used in the appropriate patient and the appropriate technique is followed.

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PROFORMA

Name : Age: Occupation:

Address: IP No: Unit:

Marital Status:

Age of Menarche:

Menstrual History: L.M.P:

Duration of Marriage:

Type of Infertility: Primary/Secondary:

Previous History of evaluation

& treatment of Infertility of Couple:

Any history of contraception:

History of PID/STD/TB:

History of Medical illness:

History of previous surgery (Appendicitis/ Ectopic):

Family History of TB/DM/HTN:

General Examination:

Systemic examination:

Breast and Thyroid Examination:

External genitalia:

Speculum Examination:

Bimanual Examination: Uterine Size/ Position:

Utero- sacral Ligament:

Adnexa

Investigations:

Complete Hemogram:

Blood Urea, Sugar:

Serum Creatinine :

Blood Grouping and RH typing:

Urine analysis: Semen analysis:

HIV (After obtaining consent):

VDRL:

Chest X-Ray:

E.C.G:

U.S.G Pelvis:

Hystero salpingogram:

Hysteroscopy:

Fundus:

Ostia	R)	L)
Cornua	R)	L)

Lateral Wall

Anterior Wall

Posterior Wall

Endocervical Canal:

Visual Clarity :

Technical difficulty:

Laparoscope:

Uterus:

Adnexa	R)	L)
	Tube	Tube
	Ovary	Ovary
	Chromotubation	Chromotubation

Pouch of Douglas:

Micro Surgery:

Intra Operative Findings: Right Tube:

Left Tube:

Procedure:

Chromopertubation:

Post Operative advice:

Treatment:

Follow Up: